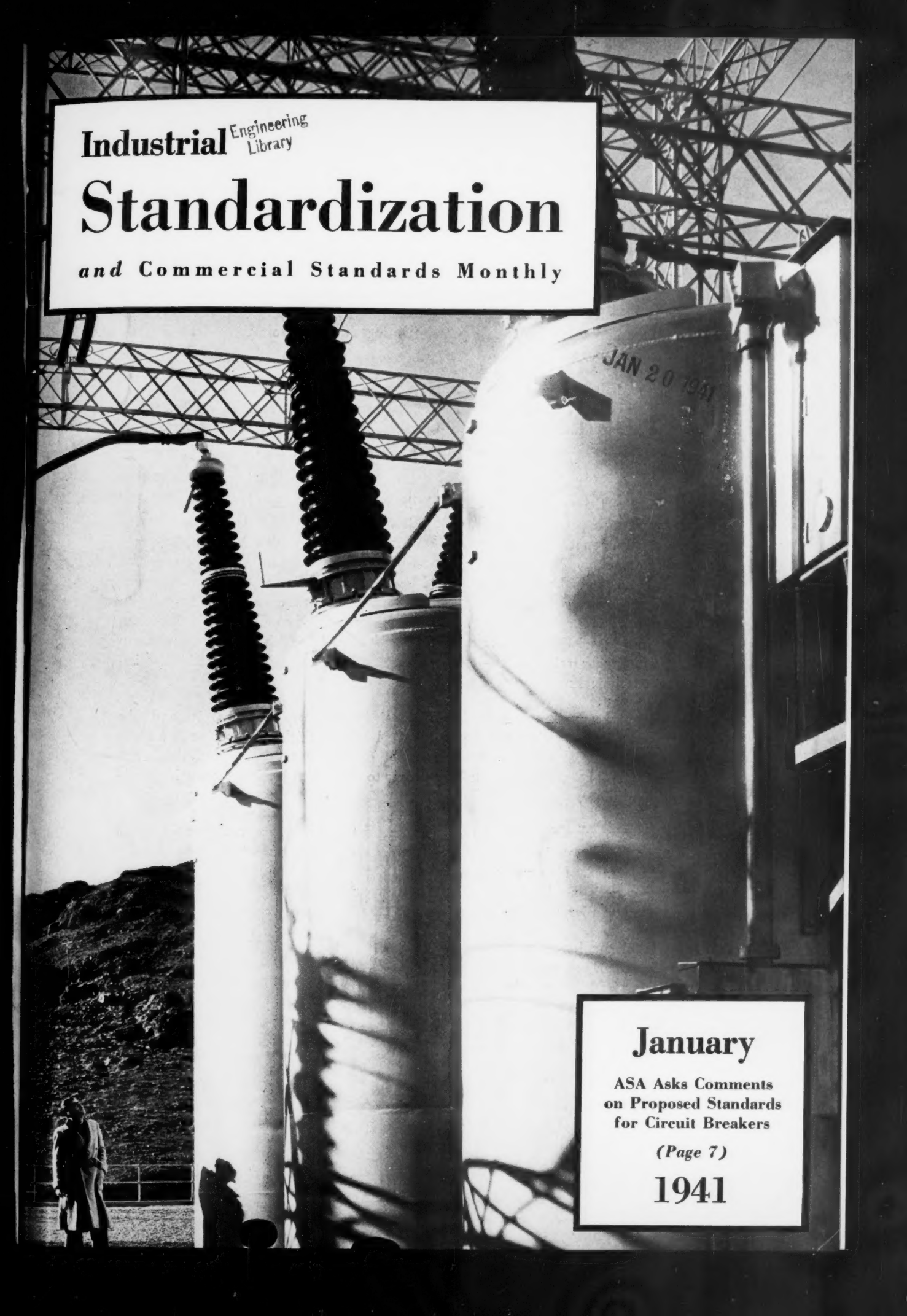


Industrial Engineering Library

Industrial Standardization

and Commercial Standards Monthly

JAN 20 1941

January

ASA Asks Comments on Proposed Standards for Circuit Breakers

(Page 7)

1941

Standards—Voluntary Agreements of Industry

THE American Standards Association has been serving as national standardizing agency for the trade associations, technical societies, and governmental groups of this country for twenty years. During this time more than 400 standards have been approved.

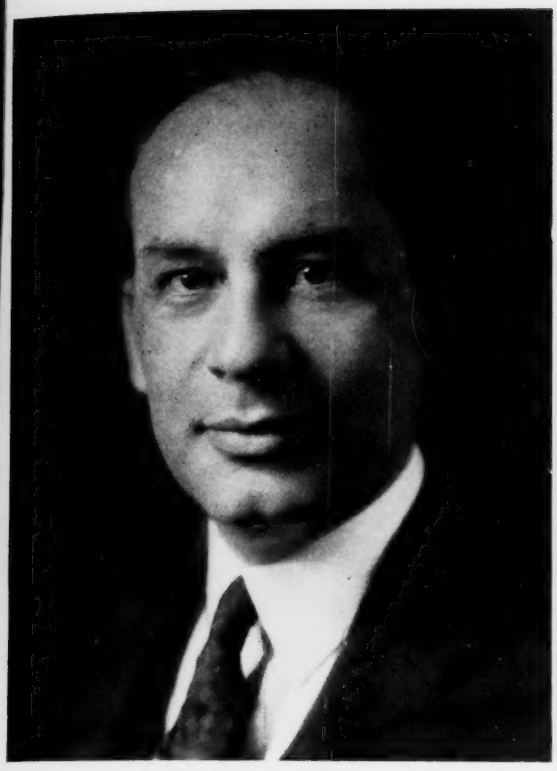
Use of these standards is not obligatory. They are developed at the request of industry for industrial use. It is true that provisions of many of them have been written into the laws of the states and of the Federal government; but the standards themselves remain as voluntary, and consequently easily revised, general agreements of industry.

Most of these standards are brought into the American Standards Association as the result of a practical and already widely felt need. Like the common law they are based upon the actual practice of companies, the recommendations of trade associations and technical societies, the needs of user groups. The early stages of most of this work have been completed long before it is brought into the American Standards Association. However, when the work reaches the point where more than one industry is involved, then for the sake of economy and convenience the American Standards Association provides a place and a method by which the many groups can codify their general practice—on sizes, materials, fits, and hundreds of other important technical matters.

Here, a committee representing all the interested groups, in the give and take of round-table discussion, can figure out the best wall thickness for pipe at a given pressure, the most effective and economical guard for a punch press, the lowest priced material that after repeated use proves to do a given job in a thoroughly workmanlike manner.

These standards once set up serve as a guide to the purchaser and save the manufacturer from spending a great deal of time rediscovering what someone else has already learned. New materials may be developed that are tougher, higher pressures may change the need for strength, but at the moment an American Standard, like the common law, represents the group opinion as to what is acceptable.

It takes a long time to standardize on a national scale. Months or years may intervene between the undertaking and the completion of the work. But the most effective standards, whether company, trade association, or national, are the ones evolved in this manner—through the participation of everyone interested.



R. E. Zimmerman

R. P. Anderson

Zimmerman Is New ASA President; Anderson Heads Standards Council

R. E. ZIMMERMAN, vice-president of the United States Steel Corporation, was elected president of the American Standards Association at the Annual Luncheon Meeting December 11 at the Hotel Astor, New York. Mr. Zimmerman has served as vice-president of the Association since 1937, when he was nominated for membership by the American Iron and Steel Institute.

Mr. Zimmerman is well-known both in industrial and educational circles. He is a member of the Metallurgical Advisory Board of the Carnegie Institute of Technology; Trustee of Hood College; and Member of the Corporation of the Massachusetts Institute of Technology.

Mr. Zimmerman succeeds Edmund A. Prentis of the firm of Spencer, White, and Prentis, who has served as president of the American Standards Association for the past two years.

Dr. R. P. Anderson of the American Petroleum Institute was re-elected chairman of the Standards Council which is in charge of all ASA technical work. Dr. Anderson has taken an outstanding part in developing standardization in the petroleum industry. He has been a member of the ASA Standards Council since 1934, as a representative of the American Petroleum Institute. This is his second term as chairman of the Standards Council.

Dr. H. S. Osborne, engineer in charge of operating results of the American Telephone and Telegraph Company, was re-elected vice-chairman of the Standards Council. Dr. Osborne, who was elected vice-chairman last year, has been a member of the Standards Council, representing the American Institute of Electrical Engineers, since 1923, almost from the time the Main Committee (now the Standards Council) was organized. He is also a member of the Electrical Standards Committee, and is vice-president and treasurer of the United States National Committee of the IEC.

300 Attend ASA Annual Meeting

Hear Sumners' Appeal for Greater Economic and Governmental Democracy

SOME 300 representatives of trade, technical, and governmental groups who hold membership in the American Standards Association met at the Annual Luncheon Meeting of the ASA at the Hotel Astor, New York, to hear Representative Hatton W. Sumners speak, and to discuss activities of the Association during the year just past.

Retiring President Edmund A. Prentis[1] called attention to the fact that the American Standards Association during the year "has been called on to fill new needs and to fit into a somewhat changed industrial pattern." He was referring to the National Defense Program, which with its need for coordination of defense-production standards, has affected many of the year's activities. For example, it has highlighted almost all standardization work in the mechanical field.

"The integration of the Government's purchasing program and industry's manufacturing program into a smooth flow of production is an enormous undertaking, and one in which standards play an important part," Mr. Prentis declared. One of the problems of the coming year, he said, would be to speed up work on undertakings most urgently needed for defense—for example, work on screw threads, on bolts, nuts, and wrench openings; on machine pins; on wire and sheet metal gages; on fits of machine parts; and on some of the safety codes which are needed to protect the inexperienced labor that is being turned into defense production. The defense program, Mr. Prentis pointed out, is requiring activities in new fields, the expansion of existing work, and increased activity on many of the projects now under way.

Adopt Resolution for Cortelyou

Mr. Prentis called attention to the great loss the American Standards Association had sustained during the past year in the death of George B. Cortelyou. A resolution of appreciation for his many services to the ASA was presented by C. L. Collens and was unanimously adopted.

Dr. R. P. Anderson,[2] reporting as chairman of the Standards Council, called attention to 73 standards approved during the year. At the meeting of the Council held just before the luncheon, he reported, the Standards Council had taken action to adopt an emergency procedure to hasten approval of standards which may be needed quickly for the defense program.

Sumners Long Interested in Standards

In presenting Representative Sumners, Mr. Prentis said: "Some time ago, the Government appointed a very important committee—the Temporary National Economic Committee, made up of three members from the House, three from the Senate, and six from the executive arms of the Government. The vice-chairman of this committee is Representative Hatton W. Sumners of Texas. He has been chairman of the Judiciary Committee of the House for years and a member of the House for 27 years. For a very long time he has been interested in standardization. In our monthly magazine (INDUSTRIAL STANDARDIZATION, April, 1940, pages 81-87) there was a detailed account of the testimony of Dr. P. G. Agnew, secretary of the ASA, when he appeared as a witness before this very important committee. As a result of this contact, we have invited Representative Sumners to come here this afternoon as our principal speaker."

Representative Sumners' address was an appeal for every individual citizen to work to preserve democracy. "Democracy," he declared, "cannot be preserved by economic feudalism. Nor can it survive by delivering powers to Washington, as the responsibility thus placed on a bureaucracy is beyond its capacity to discharge."

"If you gentlemen who are interested in stand-

[1] Mr. Prentis' report is given in full on pages 305-308 of the December, 1940, issue of INDUSTRIAL STANDARDIZATION.

[2] Dr. Anderson's report is given in full on pages 308-313 of the December, 1940, issue of INDUSTRIAL STANDARDIZATION.

A Conference At the ASA Annual Meeting

(Left to right)—Representative Hatton W. Sumners; R. E. Zimmerman, new ASA president; E. A. Prentis, retiring ASA president; P. G. Agnew, ASA secretary

ardization can work out systems of standards for commodities which are in general demand both as to raw material and finished commodities," he continued, "you probably would make it possible for the small producer of a standardized raw material to list his commodity on some market place comparable to an exchange. Then he could establish trade contact with the general market, however small he might be as a producer.

"Through a broadening of responsibility and interest, that is through a democracy of business opportunity, industry will tend to handle its own affairs, thus ending the need for government regulation of many of the details of business, as evidenced by the recent increase in the size and power of many government bureaus." (An abstract of Representative Sumners' address is given on page 4 of this issue.)

Standards Council Meets

The Annual Luncheon Meeting was held following the Annual Meeting of the ASA Standards Council which took action to adopt an emergency procedure for approving standards which may be needed quickly for the defense program. The Council also acted to send several new and revised standards to letter ballot vote, and heard the annual reports of the correlating committees which are in charge of different phases of the ASA standardization program.

The Safety Code Correlating Committee reported to the Council that the American Transit Association had become a member of the committee during the past year. It also reported that its Subcommittee on Promotion and Use of Safety Codes is being reorganized, and that the chairman and secretary of the SCCC have been authorized to review the entire list of safety code projects to determine which projects should be given priority because of their relationship to the national defense program. These officers have been given authority by the committee to hasten work on any such standards even to the point of delaying work on other projects. The committee recommended approval of four standards for allowable concentrations of toxic dusts and gases, and one for accident prevention signs.

The Mining Standardization Correlating Committee reported that its annual meeting will be held during the convention of the American Institute of Mining and Metallurgical Engineers in February. The committee is endeavoring to review practically all the standards under its supervision and believes that revisions will be necessary in several cases.

The Building Code Correlating Committee reported progress in the work of all of the 14 committees under its jurisdiction. Draft standards are now before the sectional committees on light and ventilation, administrative requirements for building codes, and minimum design loads in buildings. Draft standards on masonry and signs and outdoor display structures will soon be circulated to the committees for approval. Proposed Specifications for Portable Steel and Wood Grandstands have been submitted to the ASA for approval.

The Mechanical Standards Committee, since its meeting in April, has approved the reorganization

of the sectional committee on Wire and Sheet Metal Gages, and has recommended the initiation, sponsorship, and scope of the project on Classification of Materials for Tools, Fixtures, and Gages (B52). It recommended a proposed revision of the standard for Wrench-Head Bolts and Nuts and Wrench Openings (B18.2-1933) to the Standards Council for approval. In addition to the American Society of Tool Engineers, which recently became a new member of the MSC, the committee recommended that the Metal Cutting Tool Institute be invited to appoint a representative.

The Advisory Committee on Ultimate Consumer Goods has active work going forward in five of the committees under its jurisdiction, and expects draft standards on refrigerators, sheets and sheeting, sizes for children's garments, and bedding and upholstery, very soon. Work on hosiery is also progressing.

The Highway Traffic Standards Committee reports work going forward on colors for traffic signals, uniform traffic control devices, and automobile headlights. The committee has been informed that the Committee on Standards of the American Association of State Highway Officials has recommended that all its Association Standards be submitted to the American Standards Association for approval as American Standards.

The report of the Electrical Standards Committee is given on pages 19 to 23 of this issue.

Following the annual luncheon meeting the ASA Board of Directors met for its Annual Meeting, and took action on a number of matters of policy including a plan for a retirement fund for employees who do not come under the Social Security Act, and the plan for speeding the procedure of the ASA on urgent standardization problems connected with defense production.

Strengthen Democracy Through Individual Responsibility—

Representative Hatton W. Sumners Urges ASA Annual Meeting

WE are meeting today at a time which will be evaluated by historians as possibly the period of the world's greatest tragedy, but also as one of the peak points in history. This is a great time in which to live, but it is a terrible time to be in a position of responsibility. You, as well as every other citizen in the United States, have responsibility as part of this government, which soon may be the last of the great democracies of the earth.

Our difficulties today are greater than those which have challenged any other generation, but for that reason we have an even greater opportunity. No generation is bigger than the difficulties it has to surmount.

I have come to speak to you today because you are men of influence in this republic, and if it is to be saved, you must help save it. The people must do the job. Fundamentally, the reason why we and the other democracies of this earth are faced with the present terrible crisis is because we—as well as all private citizens—have lain down on the job. We in this country have no hereditary nobility—no hereditary governors. We, the people, and only the people, are responsible.

Much of what the government is now doing is being done because the people did not do for themselves what needed doing at the time when it should have been done. Nature does not permit power to remain where it is not used. When the people have an opportunity to do a thing, and do not take it, the opportunity departs, and the government takes over.

Our Constitution was not given to us through the divine inspiration of the men who gathered in Philadelphia to write it. They did not write it in a creative sense. It evolved from the struggles of the people through centuries of experiment and adaptation. Right now we have the ability to produce everything we need—food,

clothing, houses, money, and machinery—but we are not certain that we can preserve these against the forces within our own economic set-up which may destroy them. We have no foreign foe in America, and have had none for 100 years, but we are facing a grave danger. That danger is a weakening of both our economic and our governmental democracy. I believe we must work to preserve our democracy of opportunity as well as our democracy in government. Something the great captains of industry should begin to understand is that Democracy cannot be preserved by economic feudalism.

I believe the work of this standardization organization holds much hope for those who want to preserve democracy in opportunity and in government. If you who are interested in standardization can work out standards for commodities which are in general demand, both as to raw material and finished commodities, you can do much toward making it possible for the producer of raw material that is susceptible to standardization and the manufacturer to be able to list their raw materials and finished products for sale by descriptive grade terms. In this way, however small a producer may be, he would be able to put his product on the same general market as the large producer and the small distributor would also have access to the general market.

To bring about this economic democracy, it seems to me you must do three things. First, you must standardize them making it possible to list these commodities for sale by their descriptive grade term. Second, there must be an intermediary agency for supervision and inspection to give the general public confidence in those terms. Third, I believe that as part of that scheme you might have to establish some sort of an agency comparable to the stock market where such commodities can be listed for sale, and where people who want to sell and people who want to buy can establish trade contact. I feel this is necessary.

If that can be done then you have gone far in preserving in this country a democracy of business opportunity. You will have applied to modern trade conditions the feeling and function of the old manorial system when the community was the industrial organization and the individual was the industrial unit. Then local demand had to satisfy its own requirements with local production. In these days of cheap transportation and swift communication, small business may produce so far away from its markets that it is impossible for the customer to be thoroughly familiar with his products. The use of standards and grade labels, through the system I have indicated, would help small business to bridge the distance between itself and its customers, thus putting it on an equal footing with big business.

Helps Cut Down Government Regulation

If you can bring back this equality of business opportunity, then there will not have to be so much governmental supervision and regulation. If you cannot, then I can see nothing but for the big organizations to grow bigger and bigger, and for more federal bureaus to regulate them, the whole system taking from private property the attractive elements of ownership.

I can remember in my day when Mr. Jones was a leader in the community where I lived. He had the best store. When the little fellows had trouble they talked to Mr. Jones and Mr. Jones straightened them out. When Mr. Jones got into trouble everyone rallied to his aid. The community had something to do. The people met together to solve their mutual problems, and each individual had a personal interest in his home community. Men fight for their homes as they will not fight for a boarding house.

As we all know, there is no person with intelligence who is not interested in the safety of this country. But whatever may be the danger from without, it is my judgment that we are in tremendous danger from within. It is all right to get after the Reds—but in a way the Reds have been pretty good for this country. I do not like fleas, either, but if a watch dog is asleep and nothing else can awaken him, fleas may perform a real service.

When the original 13 independent nations came to consider their situation they recognized that they needed a common agency. They created our government in Washington to do for them what the local governments in the several states could not do so well acting separately—to provide an Army, Navy, national weights and measures, etc.

In this abstract of Representative Sumners' address before the ASA Annual Meeting, he tells ASA representatives that responsibility for preserving economic and governmental democracy in this country rests on every individual citizen, but particularly on business and professional leaders.

The democratic methods used in developing national standards hold a promise as an effective means of promoting democracy of business opportunity, he declares.

That system of government is built like a pyramid, the people first, the small units of the state governments next, and the federal organization next, but now we are trying to turn that pyramid on its apex. We are trying to have the government in Washington discharge all the functions of our local democracy. We are dissolving the states by asking the Federal Government to put up money received from the people of the states for sewers, schools, and public buildings.

We in our local communities are responsible for this situation. We have come to feel that we cannot put money into these local necessities without going to Washington for a Federal grant.

We cannot preserve our democracy by shifting our responsibilities to Washington in this way. The people must take back these responsibilities.

Our present system of bureaucracy in the Federal government did not begin with the New Deal. We are all responsible for it. Every citizen should accept his share of the shame and blame for it all. Every citizen in this solemn hour should determine that free government shall not disappear from this part of the earth.

Every business man should take account of his own responsibility and his own stake in that free government. Where would your own business be if that freedom should disappear?

I am very glad to be with you today, because I have had a keen interest in standards for 30 years. As a young lawyer back in Texas I discovered the importance of standards while advising a group of agricultural producers on some of their marketing problems.

The more I have studied some of the difficult economic problems that face this country, the more I believe in standards. These difficult economic problems, if unsolved, will leave the way open for those forces of destruction which are now threatening us from within.

A grave responsibility, therefore, rests upon the whole body of citizens but I believe a special responsibility and obligation rests upon the business men of the country—business men and engineers like yourselves—because you have facilities and opportunities of leadership which the great mass of citizens do not have. In your work on standards and in the democratic methods by which you arrive at them, you have the best methods I know of to help bring about a democracy of business opportunity. I have already stressed the importance of standards in helping to bring about such a democracy in business through their effect in freeing markets and making them available to big business and little business alike.

Only a great people can do the job that is before this country. We cannot do it in Washington. A President and a few men in Congress cannot do it. You citizens, business men of influence and responsibility—not somebody else—must do it. We must be the greatest generation that has stood on the earth. Otherwise, the greatest tragedy of all the ages will be upon us.

Standards for Labels for Jelly, Preserves, and Fruit Butters

Definitions and standards of identity for preserves, jellies, and fruit butters have been established by the Food and Drug Administration of the Federal Security Agency. These regulations became effective the first part of this month and from now on all interstate shipments will be required to comply with the new standards.

Sweetening ingredients are not required to be declared on the label except when corn sirup or honey is used, but when either corn sirup or honey is used alone or in combination with other optional sweetening ingredients, they are required to be declared on the label together with all other sweetening ingredients used.

These are the first food standards involving the so-called corn sugar issue which have been promulgated by the Federal Security Agency since the Food and Drug Administration was transferred to it from the Department of Agriculture, the Federal Security Agency states. The Agency further explains that the new regulations should not be construed as representing the Agency's final decision on the corn sugar issue. Hearings in which that issue was further considered have been held. In the event that consideration of the corn sugar question should suggest a change in policy on the standards for preserves, jellies, and fruit butters, a hearing will be held on those products with a view to amending the standards to conform to the change in policy.

The Federal Security Agency stated that the preserving industry can safely proceed at once with any changes in labels required by the standards just issued irrespective of the possibility that additional label changes may eventually be required when the Agency's policy on corn sugar is determined finally. Any amendments to the regulations that might follow would be made effective at a sufficiently later date to permit preservers to use up labels purchased now.

The definitions and standards of identity for preserves, jellies, and fruit butters are published in *Federal Register* of September 5.

ASA Asks for Comments on Proposed New Circuit Breaker Standards

New document on a-c power circuit breakers, including proposed American Standard and five proposed American Recommended Practices for the first time extends standards provisions to oil-less as well as oil circuit breakers.

Latest available information essential to those concerned with selection, performance, and test of a-c power circuit breakers is combined in a single publication.

by
H. R. Summerhayes[1]
and
G. S. Lunge[1]

THE new proposed Standard for A-C Power Circuit Breakers is the third to be completed by the ASA Sectional Committee on Power Switchgear. This committee previously submitted to the American Standards Association the American Standards on Relays Associated with Power Switchgear (C37.1-1937) and on Automatic Stations (C37.2-1937). Because of the large amount of new material represented by the proposed American Recommended Practices (C37.5 through C37.9, inclusive) included in the present document on circuit breakers, it is now being published for one year of trial in use before being submitted to the American Standards Association for final approval.

What It Covers

A-c power circuit breakers are defined, for the purposes of this proposed standard, as comprising such of the following as have rated voltages higher than 600 volts:

(*a*) Oil circuit breakers
(*b*) Circuit breakers using liquids other than oil
(*c*) Air circuit breakers.

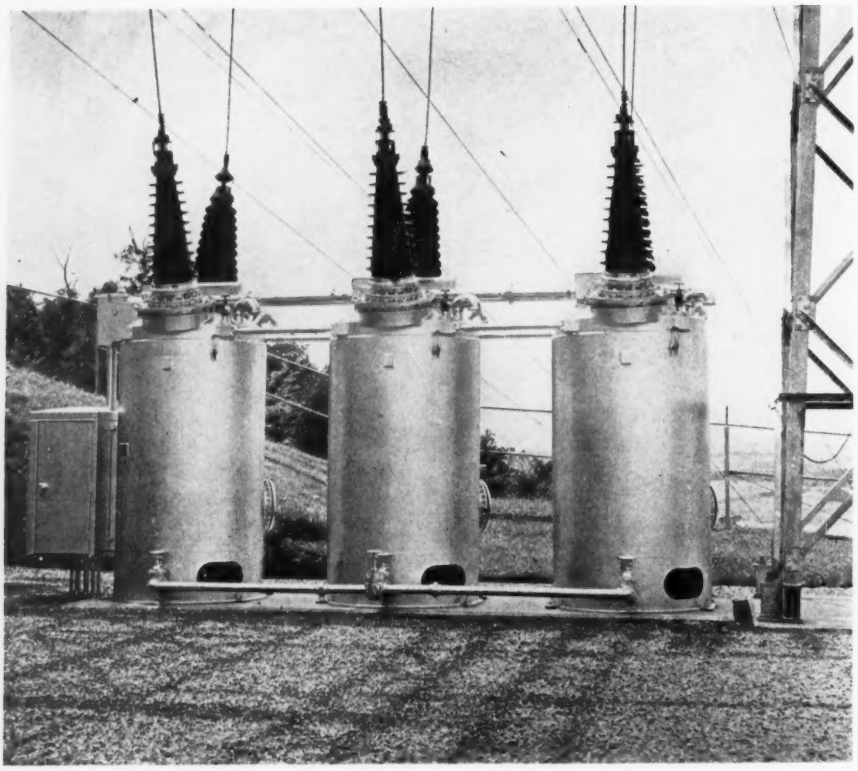
Thus, virtually all oil circuit breakers (except such few as may be built for service only at voltages of 600 volts or less) are covered. In addition, high-voltage a-c circuit breakers of oil-less types (*e.g.*, air circuit breakers, and breakers using liquids other than oil) are governed by this proposed standard, which is the first in this country to include all such breakers in its scope.

Though long in use in Europe, oil-less circuit breakers have only recently found extensive use in this country. This is due partly to the better operating record of oil circuit breakers of American manufacture, as compared with European oil circuit breakers. In part it is due to other causes. For instance, it is understood that in Germany high insurance rates on buildings containing oil circuit breakers provided a strong incentive for the introduction of circuit breakers without oil. The more recent introduction of oil-less circuit breakers in this country is probably also partly due to the fact that European designs were not always suitable for American ratings and operating conditions, so that extensive new development had to be undertaken here.

Brief History of This Standard

This project formed part of the original scope of the Sectional Committee on Power Switchgear, and work on it dates from the first meeting of the committee in October, 1933. At that time the October, 1925, edition of the AIEE Standard (No. 19) for Oil Circuit Breakers was the latest available standard for tests and performance of this class of equipment.

[1] Mr. Summerhayes and Mr. Lunge, both of the General Electric Company, are chairman and secretary, respectively, of ASA Sectional Committee on Power Switchgear (C37).



A modern example of an outdoor oil circuit breaker of the conventional tank type

During the next four and one-half years AIEE Standard No. 19 was in process of revision, necessitating several successive corresponding revisions of the proposed American Standard (C37.4). During this period the influence of draft standard C37.4 on the progressive revision of AIEE Standard No. 19 and on the formulation of the international standard for a-c circuit breakers (published in 1937 as IEC publication No. 56) was very pronounced. Thus the April, 1938, edition of AIEE Standard No. 19 contained various new features (such as recovery voltage definitions, alternating current rating, etc.) not to be found in the 1925 edition it superseded or in NEMA Standards. Likewise, IEC publication No. 56 grants equal status to the standard operating duty (CO-15 sec-CO)[2] now in vogue in this country and to the European standard operating duty (0-3 min-CO-3 min-CO).

Finally, after the appearance of the April, 1938, edition of AIEE Standard No. 19, it was decided to use the material of that Standard in its entirety, except for such obvious minor changes as were necessary to make it applicable to oil-less circuit breakers also.

It might well be asked what need is met by the publication of this proposed American Standard, if it merely duplicates material already available in AIEE Standard No. 19 of April, 1938.

This is not entirely the case, however. Since this document was to be published by the American Standards Association, it was possible to include a great deal of valuable material that would not be appropriate in an AIEE standard, the latter usually being confined to standards governing rating, performance, and factory tests. Only about half of the proposed standard virtually duplicates, except for the difference in scope, AIEE Standard No. 19. The remaining half of the publication, which has the status of American Recommended Practice, is new material, largely drawn from the National Electrical Manufacturers Association and the Association of Edison Illuminating Companies. This was included so as to combine, in a single publication, the latest available information essential to those concerned with a-c power circuit breaker selection, performance, and test.

What This Publication Includes

As just stated, approximately the first half of this publication is devoted to a definite proposed American Standard (C37.4) governing all a-c

[2] The letters CO signify the successive operations of the breaker: Closing; Opening.

power circuit breakers. Besides including pertinent definitions, a statement of its scope, and a description of standard and special service conditions (altitude, ambient temperature, etc.), this standard contains sections devoted to rating, nameplate marking, temperature rise limitations, temperature tests, and dielectric tests on completely assembled breakers.

Next in this publication is the proposed American Recommended Practice (C37.5) for determining, from oscillograms

(*a*) the rms value of a sinusoidal current wave containing a d-c component of any amount;

(*b*) the normal-frequency recovery voltage

The use of these methods of interpreting oscillograms is mandatory in any tests made to verify the rated interrupting current or the rated momentary current of a-c power circuit breakers, according to the standard (C37.4) itself.

Tables of Preferred Ratings Included

Although naturally subject to possible future change, tables of preferred ratings of outdoor and indoor oil circuit breakers are included in a separate section as Proposed American Recommended Practice (C37.6). These tables represent the latest information available at the time of printing this publication.

Automatic reclosing service will ordinarily require more severe operating duty of the breaker than is true of the standard operating duty prescribed in C37.4. Tables showing how to determine the interrupting ratings of oil circuit breakers subjected to such reclosing duty are to be found in the same publication under the heading Proposed American Recommended Practice, C37.7.

In a compact tabulation entitled Proposed American Recommended Practice, C37.8, will be

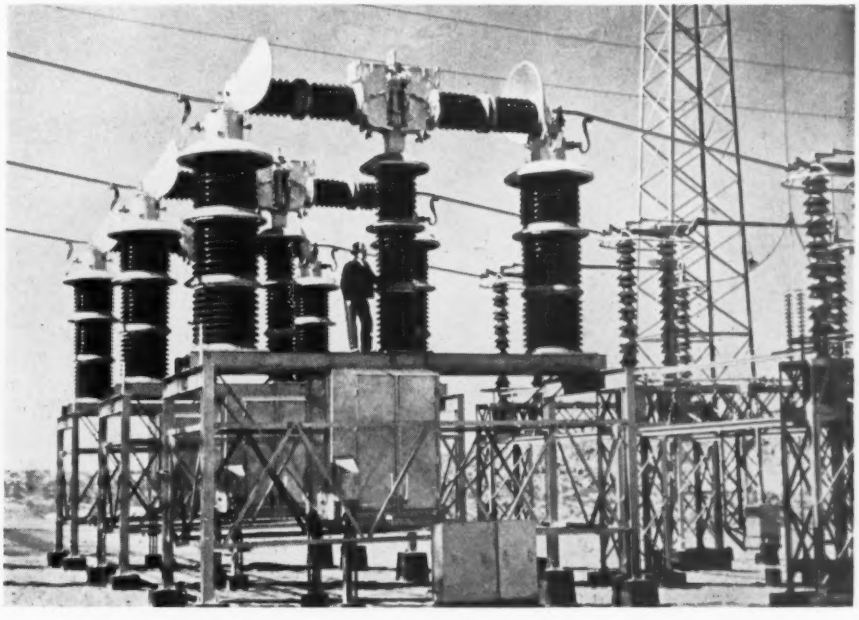
The proposed new standards on circuit breakers which have been approved by the ASA Sectional Committee on Power Switchgear for a year of trial in use include the following:

Proposed American Standard for Alternating-Current Power Circuit Breakers (C37.4)

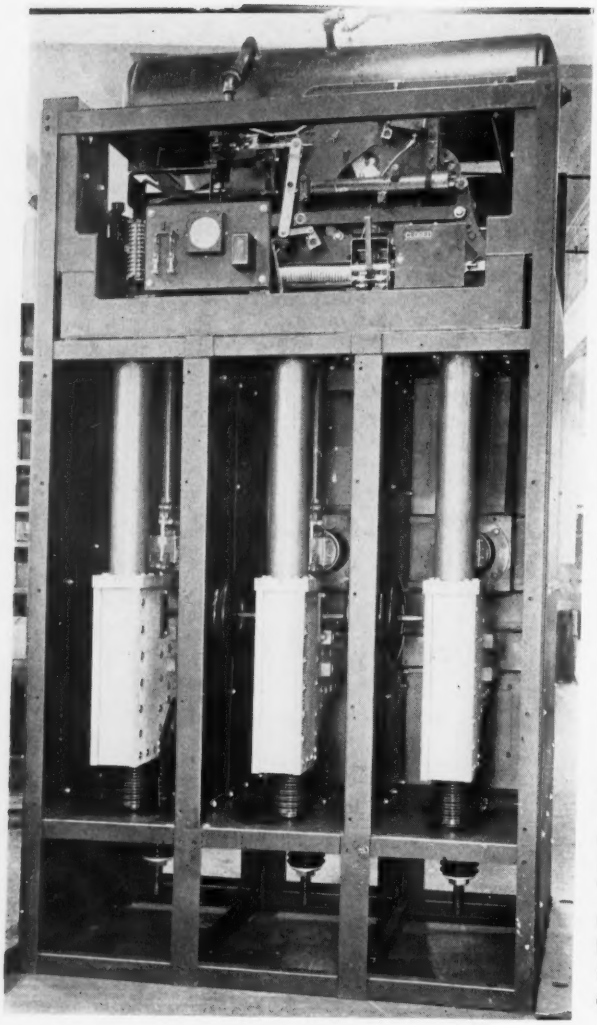
Proposed American Recommended Practices:

Methods for Determining the Rms Value of a Sinusoidal Current Wave and a Normal Frequency Recovery Voltage (C37.5)
Schedule of Preferred Circuit-Breaker Ratings (C37.6)
Operating Duty (Duty Cycle) for Standard and Reclosing Service (C37.7)
Rated Control Voltages (C37.8)
Test Code for Oil Circuit Breakers (C37.9)

These proposed standards and recommended practices have been published in one document which is available from the American Standards Association at 60 cents per copy.



Ultra-high-speed oil circuit breakers of the new low-oil content design



One type of high-voltage a-c air circuit breaker, showing the compressed air (pneumatic) operating mechanism ordinarily used with this type of circuit breaker.

found rated control voltages, with their permissible ranges, for a-c power circuit breaker closing coils and shunt trip coils.

Finally, as Proposed American Recommended Practice, C37.9, this publication includes a test code for oil circuit breakers. To most readers, this will be the most interesting and valuable portion of the work. In the space at our disposal, it is not possible to give more than a glimpse of the contents of C37.9. In the light of the information in this quite readable section of the publication, the various features of circuit breaker performance are seen in their proper perspective and are evaluated qualitatively. Definite guidance is given for the conduct of circuit breaker interrupting and short-time over-current tests, and for the evaluation of test results. Although the various transient recovery voltages are defined in the standard (C37.4 itself), the discussion of the significance of each and the recommended method of evaluating each will be found in the test code (C37.9), which concludes with a very comprehensive classified bibliography of oil circuit breaker literature.

What This Publication Will Do

By consigning all lists of preferred ratings to separate sections (C37.6, C37.7, and C37.8) having the status, not of proposed American Standards, but merely of proposed recommended practices, two desirable objects were attained:

1. Present preferred ratings will be encouraged, with consequent stabilizing effect on the industry, which has suffered in the past from a multiplicity of closely spaced ratings.
2. Undue crystallization of present ratings is avoided, so that the list can be further pruned in the future, if expedient.

The Proposed American Standard, C37.4, confirms the rules laid down by AIEE standard No. 19 of April, 1938, for oil circuit breakers, and extends the benefit of this standardizing influence to govern the performance of oil-less breakers. The acceptability of this type of circuit breaker cannot fail to be enhanced by the knowledge that there will be definite national standards of performance with which they can be specified to comply.

This publication, for all its 48 pages, is probably the most compact compendium of information on a-c power circuit breaker performance requirements and test methods to appear so far in the English language. It is hoped that it will be found to be a worthy example of an ASA publication formulated and developed by the sectional committee method.

Welcome Suggestions for Improvement

Suggestions for improvement based upon experience gained during the year of trial will be welcomed by the committee for its guidance in revising the proposed standards and submitting them for approval to the American Standards Association. Such suggestions should be sent to the American Standards Association, 29 West 39 Street, New York, as soon as possible and not later than January 15, 1942. Copies of the proposed standard and recommended practices are available from the ASA at 60 cents each.

South African Association Protects Use of "Standard"

The South African Standards Institution is cooperating closely with the Registrar of Trade Marks on all applications for a trade mark in which the word "standard" appears, the Annual Report of the Institution, just received, reports. A Mark Sub-committee, appointed to make recommendations on problems which arose in connection with a certain application for a trade mark during the year, is to remain in office and report to the Institution from time to time.

During the year the Institution studied an American bill to aid consumers by setting up standards of quality based on performance as a guide in the purchase of consumer goods, but came to the conclusion that the time was not yet ripe in South Africa to introduce standards for consumer goods where this has not already been done by Government Departments. "On the other hand," the report states, "the Institution considers it to be a step forward in the standardization movement, and its further development will be carefully followed." The Institution believes that the time will come when standards for consumer goods will play as important a role in the commerce and trade of the country as engineering and other standards do today.

The Government of the Union of South Africa is continuing full financial support to the International Electrotechnical Commission. Although no international meetings can be held at the present time, this organization should be maintained because of its undoubted usefulness to international trade when peace has been restored, the report declares.

The ASA Sectional Committee on Power Switchgear (C37) which prepared the proposed American Standard and American Recommended Practices on Circuit Breakers has the following membership:

H. R. Summerhayes, American Institute of Electrical Engineers, *Chairman*

G. S. Lunge, American Institute of Electrical Engineers, *Secretary*

American Institute of Electrical Engineers, *W. S. Edsall; Philip Sporn; H. R. Summerhayes; R. C. Van Sickle; G. S. Lunge (alt)*

American Transit Association, *J. Walter Allen*

Association of American Railroads, *S. R. Negley*

Association of Railway Electrical Engineers, *George T. Johnson*

Electric Light & Power Group, *R. N. Conwell; R. T. Henry; George Sutherland; R. W. Wilbraham; H. C. Anderson (alt); J. O'R. Coleman (alt)*

National Bureau of Standards, *M. G. Lloyd*

National Electrical Manufacturers Association, *J. S. Lawson; J. B. MacNeill; H. H. Rudd; G. V. Smith; C. B. Springer; R. M. Spurck*

Underwriters' Laboratories, Inc., *R. B. Shepard; M. M. Brandon (alt)*

Two subcommittees of this general committee prepared the drafts of the proposed standards for consideration by members of the main committee:

Oil Circuit-Breaker Subcommittee

G. Sutherland, *Chairman;* R. T. Henry; J. B. MacNeill; R. M. Spurck; and R. W. Wilbraham.

Test Code Subcommittee

R. W. Wilbraham, *Chairman;* J. K. Ostrander; W. F. Skeats; R. C. Van Sickle

---

Revised Bolt and Nut Standard Is Submitted for ASA Approval

A revision of the American Standard for Wrench-Head Bolts and Nuts and Wrench Openings (B18.2-1933), one of the standards of particular importance to industry in connection with the industrial mobilization program, has been submitted to the American Standards Association for approval. The standard covers regular and heavy bolt heads; cap and set screw heads; regular, heavy, and light nuts, jam nuts, and slotted nuts; machine screw and stove bolt nuts; light castle nuts and slotted nuts; and wrench openings. An Appendix gives a table of recommended thread lengths for bolts and formulas for bolt, cap screw, and set screw heads, and for nuts.

It is understood that the Interdepartmental Screw Thread Committee will recognize this revised American Standard, when finally approved by the ASA, for use by the Government services.

The revision was prepared by Subcommittee 2 on Wrench Head Bolts and Nuts (W. K. Mendenhall, Jr., U. S. Navy, Chairman) of the ASA Sectional Committee on Bolt, Nut, and Rivet Proportions under the leadership of the American Society of Mechanical Engineers and the Society of Automotive Engineers.

Aircraft Manufacturers Organize National Standards Committee

The National Aircraft Standards Committee was formed at a meeting of 22 of the major aircraft manufacturing companies held in St. Louis, November 7, 1940. Prior to the creation of this new organization there existed on the east coast an Eastern Standards Committee and on the west coast a Western Standards Committee. These committees have now been merged with the national committee, which has as its aim the development of standards and promotion of their use among the aircraft manufacturers.

In the development of standards the committee plans to confer with similar committees of the engine, propeller, accessory, and materials manufacturers. The committee is also working directly with the joint Aeronautical Board of the Army and Navy in order to give every possible cooperation in the development of the emergency program.

The officers of the National Aircraft Standards Committee are W. M. Smith, Bell Aircraft Corporation, National Chairman; J. T. Thompson, Glenn L. Martin Company, Vice Chairman for Eastern Division; and J. F. Cox, Vega Airplane Company, Vice Chairman for the Western Division.

British Emergency Revisions Affect Steel Standards

War emergency revisions of several British standards for steel have been made due to the comparative scarcity of raw materials sufficiently low in sulphur and phosphorus for the production of steels to comply with normal British Standards.

The maximum percentage of sulphur and phosphorus permitted in the material in the following two standards has been increased in the emergency standards by 0.01 per cent:

Material Used in the Construction of Railway Rolling Stock (BS 24, Parts I and II, 1923)

Solid Rolled Steel Railway Wheels and Disc Wheel Centers (BS 468, 1932)

Increased working stresses, effective for buildings erected during the period of the war and for 12 months thereafter, are provided in a war emergency revision to the British Standard for the Use of Structural Steel in Building (BS 449-1937). After the period named the specification is to revert to its original form unless in the meantime the revision has been confirmed or some other modification adopted.

Tolerances for Cylindrical Fits

The National Defense Program requires thousands of products which depend for their proper assembly and function upon the establishment of correct fits between cylindrical parts. The standardization of these fits is therefore, a problem of major importance in manufacturing—now, more than ever before.

For this reason, INDUSTRIAL STANDARDIZATION is fortunate in being able to present a discussion of the problem of fits by John Gaillard, secretary of the ASA Mechanical Standards Committee. This committee has jurisdiction over all mechanical standards including the American Tentative Standard on Tolerances, Allowances and Gages for Metal Fits (B4a-1925), the revision of which is now under consideration. Also, Dr. Gaillard has followed closely the development of foreign standards in this field and their international unification.

This discussion was originally presented as an informal talk before the Industrial Standards Group of the Industrial Management Council, Rochester, N. Y. It will be published in four instalments. The first section (pages 13-16 of this issue) deals with the general principles applying in the ideal case where parts are made to exact sizes, no tolerances being required. The second part (February issue) will show how this ideal problem is modified in practice by the necessity of giving a tolerance on each part. The control of fits by means of limit gages will be the subject of the third instalment (March issue), and a review of national and international systems will complete the discussion (April issue).

Upon request, the entire article is being made available *at once* in pamphlet form, for the convenience of those interested. Copies may be obtained from the American Standards Association at 25 cents each.

Tolerances for Cylindrical Fits

by John Gaillard

Mechanical Engineer, American Standards Association

FITS between cylindrical parts or, briefly, cylindrical fits, govern the proper assembly and performance of countless mechanisms. Clearance fits permit relative freedom of motion between a shaft and a hole—axially, radially, or both. Interference fits must secure a certain amount of tightness between parts, whether these are meant to remain permanently assembled or to be taken apart from time to time. Or again, two parts may be required to fit together snugly —without apparent tightness or looseness.

The designer's problem is to specify these different types of fits in such a way that the shop can establish them. This specification involves the adoption of two manufacturing limits each for the hole and the shaft and, hence, the adoption of a manufacturing tolerance on each part.

If the various types of fits can be divided into classes of a general character and each class covered by definite limits or tolerances, this will make possible general interchangeability between parts of the same nominal size and class of fit. It is on this principle that mass production methods are based. Also, a standard system of tolerances to which the designer can refer makes it easier for him to specify fits on drawings.

We shall consider here the basic principles underlying a standard system of fits. In doing this, we shall not concern ourselves with such questions as what type of fit is required for a specific kind of work, or what tolerance on a given part can be held in the shop without undue care and cost. Such questions, while very important in practice, are to be answered in each case by the designer who must keep in mind the desired performance of the product as well as the manufacturing facilities of the shop. However, in discussing the general method of standardizing fits, these specific practical questions can be disregarded.

To simplify our discussion, we shall begin by assuming that we can make holes and shafts exactly to specified sizes, or in other words, that we do not have to give a tolerance on a part. Proceeding from this idealized case to the practical problem, we shall see how tolerances affect the setting up of a standard system of fits. Following this, we shall deal with the basic requirements of the maintenance of correct fits by means of limit gages. Finally, we shall briefly review the present status of the problem from the viewpoint of national and international unification.

I. The Simplified Problem

If we assume that we can make the hole and the shaft each to an exact size, without having to give a tolerance on either of them, we find that all fits can be reduced to three main types, indicated by **A, B,** and **C,** Fig. 1. Here, the same hole is represented in combination with three different pins. One pin is smaller than the hole (case **A**), the second one has the same size as the hole (case **B**) and the third pin is larger than the hole (case **C**). Here, we have: a loose fit (**A**) characterized by a clearance between the parts and, hence, also called a *clearance fit;* a tight fit (**C**) produced by interference of metal when the parts are assembled and, hence, also called an *interference fit;* and, between the two types just mentioned, a fit **B** which is neither loose nor tight and may be called, for the purpose of this discussion, a *neutral* fit.

The three basic types of fit are represented in Fig. 1 also by the diagrams **A′**, **B′**, and **C′**. Just as in **A′** the two concentric circles indicate a clearance, just so the heavy black circle in **C′** indicates an interference of metal. This form of symbolism will come handy in the visualization of fits to be used later.

Fig. 1 also gives a diagram **A″** which represents a loose fit all of whose clearance is given on one side of the shaft, instead of being distributed evenly around the circumference, as in **A′**. Either of the two conditions, **A′** or **A″**, or any condition lying between these two extremes, may occur in practice, depending on load, speed, lubrication pressure, etc. However, when we discuss problems of fit, we mean by clearance or interference, the difference between the actual diameters of hole and shaft. Therefore, when a fit is represented by a diagram, either of the kind used in Fig. 1 or by any other diagram, it is easiest to visualize all of the clearance as being on one side, as in **A″**. Otherwise, we would

Copyright, 1941 by American Standards Association.

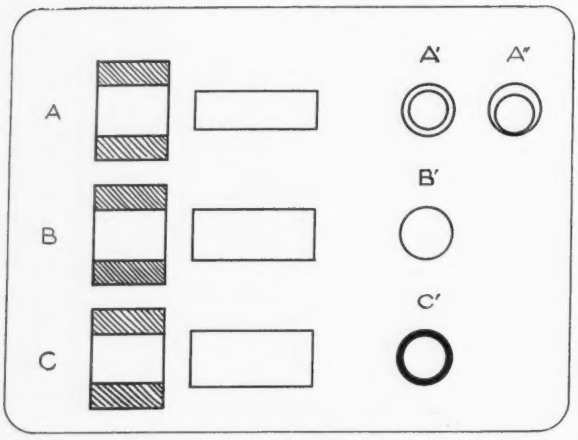


Fig. 1. Loose, "neutral," and tight fit

have to count with the sum of two partial clearances, in designing a fit. Similarly, when dealing with a tight fit we shall assume that all of the interference is accumulated on one side of the shaft, to facilitate the representation of such a fit by means of a diagram—even though by its very nature, interference always is distributed rather evenly around the circumference.

One Fit for Different Diameters

Let us assume that under given conditions of load, rpm, etc. a certain clearance, say .0008 inch, or briefly, 8 "tenths", is required to secure a proper running fit between a hole and a shaft with a nominal size of one inch. The question then arises: What should be the clearance between a hole and a shaft with nominal diameters of 2 inches, 3 inches, 4 inches, etc.—if we wish to get the same kind of fit as applied to the parts with the nominal size of one inch?

Practical experience has shown that the clearance must not increase, in such a case, in the same rate as the nominal diameter, but less than that. If we plot the diameter on the horizontal axis and the clearance required for a fit of a certain character, on the vertical axis, as in Fig. 2, we get a curve that may be represented, for example, by the formula:

$$c = a \sqrt[3]{d^2}$$

in which: c = clearance in "tenths"
d = nominal diameter in inches
a = a constant whose value depends on the type of clearance fit required (close or wide)

All modern systems of fits are based on curves of this kind. While having a mathematical form, the curves represent the results of practical experience. No designer could determine the correct curves applicable to specific cases, solely on theoretical grounds.

For some kinds of fit we get better results if we add a linear factor $b.d$ (in which b is a constant) to the factor $a \sqrt[3]{d^2}$. However, such considerations are not essential to our present discussion and to keep this simple, we shall continue to use the formula given above.

If we actually used this formula, or the curve it represents (Fig. 2), to determine the clearance between any set of mating parts with a nominal diameter up to 8 in., we would have to use a different clearance for *every* diameter. In tabulating fits, we would then have to list the nominal diameters with steps as small as, say, 1/16 in., to give the designer sufficient choice. Or, instead of tabulating the fits, we could leave it to the designer to figure out the clearance for each nominal size in which he is interested—a rather clumsy procedure.

Constant Clearance Ranges

Fortunately, it is not necessary to follow either of the two methods just indicated. Experience shows that the character of most fits does not change appreciably with a slight change in the clearance. Conversely, the clearance may be kept constant for a certain range of nominal diameters, without impairing the general character of the fit. This facility enables us to replace the curve of steadily increasing clearances, Fig. 2, by a series of constant clearances each of which applies to a certain *range* of nominal diameters. In the example chosen, the total range of diameters from ½ to 8 in. is covered by six steps, as follows: ½ to ¾; ¾ to 1¼; 1¼ to 2; 2 to 3;

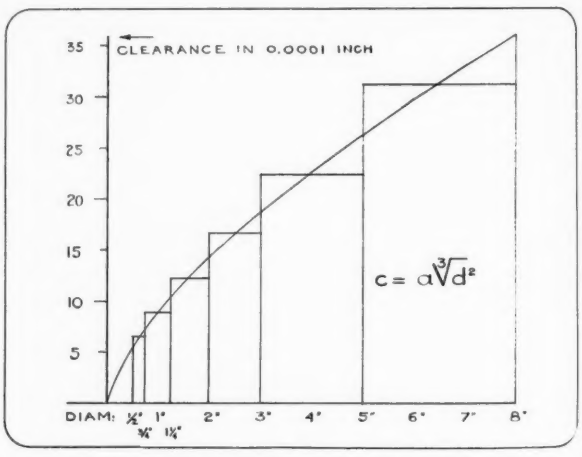


Fig. 2. Relation between clearance and diameter

3 to 5; and 5 to 8 in., with six corresponding clearances increasing from about 7 to about 31 tenths. These six clearance values are easy to tabulate and the designer has no computing to do.

Class of Fit

Curves of varying steepness may be plotted for fits with clearances smaller or larger than those represented in Fig. 2. Similar curves may be drawn for interference fits of varying character. Incidentally, in the latter case it will be logical to plot the curves below the horizontal axis because an interference is to be considered as a negative clearance.

In this way we get a series of curves and, derived therefrom, a series of stepped clearances or interferences representing a number of fits applied to a given range of nominal diameters. Each curve or group of steps corresponds to a given *class of fit*—which may vary from a wide running fit to a heavy press fit.

In the simplified picture which we have been considering so far, the *class* of a fit is indicated by the numerical value of its clearance or interference. We shall see later how this indication is modified when tolerances on the parts must be taken into account.

How Many Classes Needed?

The number of different classes of fit required by a manufacturing concern depends on the nature of its work. The product may call for fits of all of the three main types (loose, neutral and tight) or it may require solely, say, clearance fits.

Therefore, a standard system of fits intended for a particular industry must be based on the collective needs of the manufacturing units of that industry and, again, a national standard system must cover the general needs of all industries interested in the problem of fits. Consequently, to give every company what it needs, a national system is bound to comprise many more classes of fit than are used by the average manufacturing concern. This fact should be kept in mind when the requirements of a national system are studied. Sometimes, a proposal is criticized solely because it looks too comprehensive to a specific group of users who overlook the fact that a national standard has to cover more ground than a standard applicable only to a given branch of industry.

Complete Series of Classes of Fit

To visualize a complete series of classes of fit ranging from very loose fits to very tight ones, the diagram, Fig. 3, shows the clearances and interferences, in tenths, applicable to a shaft with a nominal diameter of 1⅛ inch intended to be

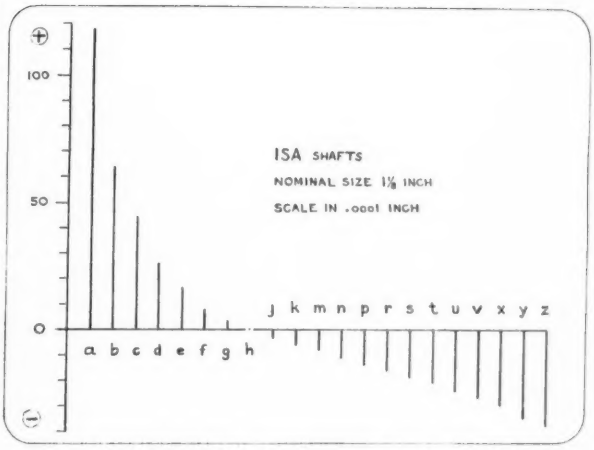


Fig. 3. Shafts for 21 different fits with the same hole

mated with a hole measuring 1.250 inch. This series provides 21 classes of fit ranging from a loose one given by shaft **a** (clearance .0118 in.) to a tight one given by shaft **z** (interference .0038 in.). About halfway between **a** and **z** lies a shaft **h** whose clearance is zero. This shaft gives a "neutral" fit with a hole whose size is 1.1250 in.

The diagram, Fig. 3, is based on data applying to the so-called ISA System of Fits, to be discussed lated. Obviously, few manufacturing concerns need all of the 21 classes of fit shown here. On the other hand, the 21 classes will take care of most of the fits required by the national industry as a whole. If a company requires a fit not found in this series, the work in question may fairly be considered as special.

System of Fits

The set-up of a complete system of fits is represented by the diagram, Fig. 4. This shows a collection of holes and shafts designed to give five different classes of fit (numbered 1 to 5) between holes and shafts of six different nominal diameters (indicated by letters **A** to **F**). In the shop, the five classes of fit might possibly be called: loose, running, snug, tight, and press fit.

From the variety shown, each company can pick the fits it wants as to class and nominal diameter. To satisfy the needs of the entire industry, a national system, as visualized by a diagram of this kind (Fig. 4) must be extended much more in both directions, horizontally and vertically. For example, the American Tentative Standard approved in 1925 (now under revision) gives eight different fits (Classes 1 to 8) and covers a range of diameters up to 8 in., for classes 1 to 6 inclusive, and up to 120 in., for classes

7 and 8[1]. The ISA System would be represented by a diagram comprising 21 classes of fit, horizontally, and a range of diameters up to about 20 in. vertically.

Basic Hole and Basic Shaft Systems

In the diagram, Fig. 4, it has been assumed that different fits between parts of a given nominal size are obtained by keeping the size of the hole constant and varying the size of the shaft. Accordingly, in any horizontal row of fits, the outer circle—which represents the hole—has the same diameter, while the inner circle—which represents the shaft—varies to indicate the degree of clearance (fits 1 and 2) or interference (fits 4 and 5). For the neutral fit (3), the two circles coincide.

The arrangement shown here is such that for any given nominal diameter the hole remains constant and the clearance required for a loose fit is taken from the shaft size. Conversely, the interference required by a tight fit is added to the shaft size. In other words, the hole forms a fixed basis and the shaft varies. Therefore, a system of this kind is called a *Basic Hole* system.

Fits identical to those shown in Fig. 4 could be produced by keeping the shaft size constant for every nominal diameter, and varying the hole size, to get the required fit. In this arrangement, called the *Basic Shaft* system, the clearance of a loose fit is added to the nominal hole size and the interference of a tight fit is deducted from the nominal hole size.

While the same fits can be produced either in the Basic Hole or the Basic Shaft system, the designer must decide on the adoption of either system, to secure general interchangeability. Obviously, a shaft dimensioned to give a certain fit with a hole in the Basic Hole system, differs in size from the shaft giving the same fit in the Basic Shaft system. For example, in Fig. 4, shaft **A1** is smaller than the nominal diameter (size of basic hole) while in the Basic Shaft system, the corresponding shaft would have the nominal diameter.

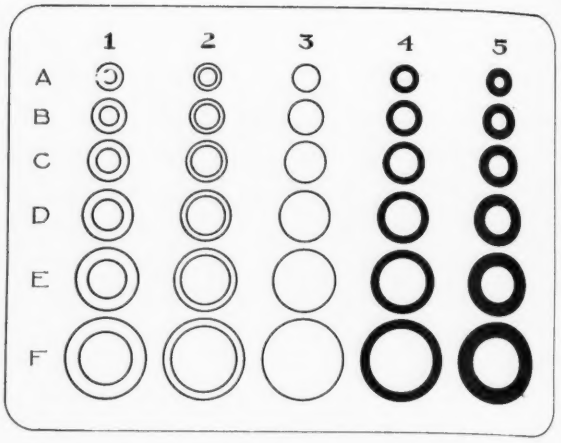


Fig. 4. Diagram illustrating a system of fits

Which of the two systems, Basic Hole or Basic Shaft, should be adopted, depends on many conditions—first of all, on the nature of the product to be manufactured. Taking industry in general, the Basic Hole system is used more widely than the Basic Shaft system. There are indications that, roughly speaking, the ratio may be something like 4 to 1. This shows that the Basic Shaft system, while used less frequently, cannot be neglected in setting up a national standard system. Some branches of industry prefer it. Thus, the manufacturers of textile machinery use a large volume of cold-finished shafting. The Basic Shaft system permits them to use this stock without machining it and yet, to mount on the same shaft, without stepping it, several parts with different fits.

[1] Tolerances, Allowances, and Gages for Metal Fits (B4a-1925) approved by the American Standards Association in 1925. This document will be referred to from now on as the ATS B4a-1925 for the sake of brevity.

Agriculture Department Defines "Lard"

Since November 1, lard that enters interstate commerce must be made exclusively from the more desirable hog fats; that made with less desirable fats will be known as rendered pork fat. At present this less desirable product is sold as lard. The distinction is being made as the result of standards of identity issued by the Department of Agriculture.

Consumers have long been asking for quality grades to enable them to make sure that they get the quality of product they think they are buying, according to *Consumers' Guide*, October 1, 1940. The present standards of identity are a move in the direction of more informative labeling, the article declares, although technical difficulties stand in the way of development of A-B-C grades at present. These lard standards are compulsory, but the A-B-C grades which the Department of Agriculture has worked out for many food products are voluntary.

The lard standards were issued under authority given in the Meat Inspection Act of 1906. Similar standards of identity which are being issued for other foods, mainly canned fruits and vegetables, and dairy products, come under the jurisdiction of the Food, Drug and Cosmetic Act of 1938.

New Federal Specifications Approved and Published

Many new Federal Specifications have been approved lately for use in Government purchasing. These are listed below and may be obtained from the Superintendent of Documents, Government Printing Office, Washington, D. C. at five cents each.

Aluminum-alloy (aluminum-manganese); plates and sheets. (Amendment 3) QQ-A-359 Jan. 1, 1941

Aluminum-base-alloys; sand-castings. (Amendment-1) QQ-A-601 Dec. 1, 1940

Atomizers; hand. (Amendment-3) GG-A-761 Nov. 15, 1940

Basins, pus; corrosion-resisting-steel. (New) RR-B-126 Jan. 1, 1941

Basins, solution; corrosion-resisting-steel. (New) RR-B-128 Jan. 1, 1941

Belting; conveyor, cotton (solid-woven). (Amendment 2) JJ-B-191 Nov. 15, 1940

Belting; conveyor, narrow (stitched-duck). (Amendment-2) DDD-B-166 Dec. 15, 1940

Blinds; venetian, wood-slat. (Amendment-1) LLL-B-441 Dec. 15, 1940

Brooms; corn. (Amendment 4) H-B-51 Nov. 15, 1940

Brooms; whisk. (Amendment-2) H-B-101 Jan. 1, 1941

Brushes; radiator, bronzing. (Amendment 2) H-B-451 Nov. 15, 1940

Bunting; cotton, mercerized. (Amendment 3) CCC-B-791a Nov. 15, 1940

Calcimine (cold- and hot-water types). (New) TT-C-96 Dec. 1, 1940

Carbon paper; light-weight (typewriter), black. (Amendment 3) UU-P-151a Dec. 15, 1940

Carbon paper; standard-weight (typewriter), black. (Amendment 3) UU-P-156a Dec. 15, 1940

Cereals, breakfast; prepared (ready-to-eat). (Amendment 1) N-C-196 Dec. 15, 1940

Cherries; canned. (Amendment 2) Z-C-301 Nov. 15, 1940

Chrome, green; oxide. (Amendment 2) TT-C-231 Nov. 15, 1940

Cuspidors (spittoons). (Amendment 1) RR-C-844 Dec. 15, 1940

Fish; fresh. (Amendment 1) PP-F-381a Nov. 15, 1940 (Applicable to Navy Department purchases only)

Flour; wheat. (Amendment 3) N-F-481 Nov. 15, 1940. (Applicable to War Department purchases only)

Gelatin, dessert-powder and plain; and starch-dessert-powder. (Amendment 3) C-G-191a Dec. 15, 1940

Griddles; cast-iron. (New) RR-G-681 Dec. 15, 1940

Ink; copying and record. (Amendment 1) TT-I-521 Nov. 15, 1940

Ink, stamp-pad. (Amendment 1) TT-I-556 Nov. 15, 1940

Iron, gray; castings. (Amendment 1) QQ-I-652 Nov. 15, 1940

Lard substitutes. (Amendment 3) EE-L-101a Nov. 15, 1940

Leather; strap, black and russet. (Amendment 1) KK-L-271 Nov. 15, 1940 (War Department only)

Macaroni; spaghetti; and vermicelli. (Amendment 2) N-M-51

Milk; fresh. (Amendment 1) C-M-381b Nov. 15, 1940

Mincemeat. (Amendment 2) PP-M-351 Dec. 15, 1940

Paint; titanium-zinc and titanium-zinc-lead, outside, ready-mixed, white. (Amendment 1) TT-P-101a Nov. 15, 1940

Paints; ready-mixed and semipaste, olive drab. (Amendment 1) TT-P-81 Nov. 15, 1940

Pans, fry; steel. (New) RR-P-89 Dec. 1, 1940

Paper; kraft, wrapping, waterproofed. (Amendment 2) UU-P-271 Dec. 15, 1940

Paper; stencil, board. (Amendment 1) UU-P-543a Dec. 15, 1940

Phenolic-condensation-products; laminated (for electrical purposes). (New) HH-P-256 Dec. 1, 1940

Planes. (New) GGG-P-436 Nov. 15, 1940

Powder; baking. (Amendment 2) EE-P-611 Nov. 15, 1940

Receptacles, waste-paper; fiber, office and lobby. (Amendment 1) LLL-R-191a Nov. 15, 1940

Road and paving materials; general specifications (methods for sampling and testing). (Amendment 1) SS-R-406 Nov. 15, 1940

Sausage; bologna-style. (Amendment 1) PP-S-71 Nov. 15, 1940

Sausages; frankfurter-style. (Amendment 2) PP-S-81 Nov. 15, 1940

Shades, window; rollers, slats, cords, and accessories. (Amendment 1) DDD-S-251 Nov. 15, 1940

Sirup. (Amendment 3) JJJ-S-351a Nov. 15, 1940

Soda, laundry; modified (washing soda). (Amendment 1) P-S-641a Nov. 15, 1940

Tape; gummed, mending. (Amendment 1) UU-T-101a Dec. 15, 1940

Textiles; general specifications, test methods. (Amendment 1) CCC-T-191a Nov. 15, 1940

Turkeys; dressed. (Amendment 1) PP-T-791a Nov. 15, 1940

Varnish; spar, water-resisting. (Amendment 2) TT-V-121a Nov. 15, 1940

The dates above indicate when the new and amended specifications become effective.

"In briefly scanning the past 35 years in searching for the roots that have been responsible for the growth of today, the conclusion is that evolution, standardization, and research have been determining factors."—*David Beecroft, Bendix Products Division, Bendix Aviation Corporation, From the SAE Journal, July,* 1940.

Revision Provides Two Changes In Steel Pipe Flange Standard

An Addendum to the American Standard for Steel Pipe Flanges and Flanged Fittings (B16e-1939) has been approved by the American Standards Association to take care of two important changes. One of these is a change in depth of groove in five sizes in seven tables of the original standard. The 31 dimensions given in the Addendum are exceptions to the design rule of the original standard. In the original design of the ring joint the bottom of the groove was placed in the plane of the flange edge. Additional material was then added to the face of the minimum flange to provide for the groove depth, L. The addendum is an exception to this rule, providing for a groove cutting 1/32 in. into the minimum flange thickness.

The other change is the addition of bolt lengths for certain sizes for ring joints in three tables of the original standard.

From now on this Addendum (B16e4-1940) will be supplied free of charge with every copy of the American Standard for Steel Pipe Flanges and Flanged Fittings (B16e-1939) in order to bring it up-to-date. Copies of the Addendum are also available free of charge to any one who has a copy of the standard.

The Heating, Piping and Air Conditioning Contractors National Association, the Manufacturers' Standardization Society of the Valve and Fittings Industry, and the American Society of Mechanical Engineers are sponsors for the project on Pipe Flanges and Fittings.

Australia Starts Work on Cutting Tool Standards

Standard specifications for cutting tools are needed, the Australian Controller of Machine Tools and Gages of the Ministry of Munitions has informed the Standards Association of Australia. The Controller has asked the Association to prepare specifications for the manufacture of screwing taps for British Standard Whitworth, British Standard Fine and British Association Threads in conformity with the requirements of the British Standards Institution specifications for such threads.

"It has been the practice in Government munitions and other establishments to prepare drawings for tools ordered external to their own organization," the *SAA Bulletin* for October explains, "but with the rapid expansion of the munitions industry in private firms it has been found that the general practice is to order taps to be capable of tapping holes to certain specifications. This leaves the fixing of limits of manufacture for the tap itself to the firm engaged to do that work. This being the case, it is felt that the preparation of a Standard Specification for Taps would be of considerable benefit to industry generally and to the munitions industry in particular at the present time."

The Australian Association has asked the British Standards Institution for information on the work of the British Taps and Dies Committee in order that the Australian and British standards may be as uniform as possible.

Insurance Bulletins Aid In Building Code Work

As a service to its members the Associated Factory Mutual Fire Insurance Companies is issuing a series of Loss Prevention Bulletins giving information and hints as to how they can make their factories safer and thus lower insurance rates.

These reports directly apply to the work on building code requirements now being carried out by several ASA committees, and copies will be made available to those committees for consideration.

Bulletins issued recently include: Factory Chimneys—Concrete and Brick; Protecting Your Tools of Production; Anchorage for Factory Roofs; and Specifications for Laying Fire Mains.

Information about the bulletins is available from the Inspection Department, Associated Factory Mutual Fire Insurance Companies, 184 High Street, Boston, Mass.

Mass Production Savings Seen In Standard Stair Designs

Designs for six types of steel stairs for use in low-cost and defense housing have been prepared by the Southern Association of Ornamental Metal Manufacturers. The designs follow U. S. Housing Authority recommendations and suggested specifications and are free from patented features. They can be built by any qualified ornamental iron shop in the United States, according to an announcement in the *Trade Association Letter* issued by the Chamber of Commerce of the United States, October, 1940.

Advantages of following the designs, the announcement states, include: probable use in excess of the 60-year period of amortization; compliance with the suggested specifications of the USHA; freedom from criticisms involved in using special patented features; and lower prices because of the standardized product.

ASA Electrical Committees Report Active Work on Standards

Eleven standards recommended by Electrical Standards Committee are approved by Standards Council during the year

Active work on revisions of approved standards is going forward in 19 electrical committees under ESC jurisdiction

APPROVAL of eleven standards during the past year, and active revisions going forward on standards under the supervision of at least 19 other committees, were reported at the Annual Meeting of the Electrical Standards Committee December 4 by the sectional committees working under ESC supervision. New standards are nearly completed on rope-stranded conductors and on rubber-insulated, varnish-cloth-insulated, and paper-insulated cable, the committees reported. One proposed new standard, that on transformers, has been published and is out for a year's trial, and another, on circuit breakers, is nearing completion.

Two new committees on preferred voltages and storage batteries have been organized, and the committee on electric welding apparatus reorganized during the past year. All three committees are expected to start active work soon.

In addition to their other activities, the electrical committees have been giving careful consideration to all tentative standards under their jurisdiction, and as a result six tentative standards on wood poles have already been recommended for advancement to American Standard.

In the reports published below, the name of the organization sponsoring the work of the committee is given. In those cases where the name of the chairman or secretary is shown, the Electrical Standards Committee is acting as sponsor.

NATIONAL ELECTRICAL CODE (C1-1940)—The regular triennial revision of the National Electrical Code was completed this year and approved by the American Standards Association in August.—*National Fire Protection Association.*

NATIONAL ELECTRICAL SAFETY CODE (C2)—Revisions have been completed on all parts of this Code except Part 2, Rules for the Installation and Maintenance of Overhead and Underground Electrical Supply and Communication. Parts 4 and 5, Rules for the Operation of Electric Equipment and Lines, and Rules for Radio Installations, have been approved by the ASA and Parts 1 and 3 on installation and maintenance of electrical supply stations; and on installation and maintenance of electric utilization equipment, have been ordered to letter ballot of the ESC for recommendation to Standards Council.[1]—*National Bureau of Standards, U. S. Department of Commerce.*

CODE FOR PROTECTION AGAINST LIGHTNING (C5)—No revision of the present code, which was approved in 1937, is being considered. Part III, approved as tentative standard, has now been recommended for approval as standard. Although a report on the protection of electric circuits and equipment, prepared by this committee and published in 1929, is now obsolete in some respects, no action is being taken to bring it up-to-date or to establish recognized standards in this field.—*American Institute of Electrical Engineers; National Bureau of Standards.*

ROTATION, CONNECTIONS, AND TERMINAL MARKINGS FOR ELECTRIC POWER APPARATUS (C6)—Several revisions to the standard approved in

[1] Part 6 of the National Electrical Safety Code, on Electric Fences, was considered at the meeting of the Electrical Standards Committee, December 4. The ESC is taking a letter ballot on the initiation of a new project on Electric Fences under the sponsorship of the National Bureau of Standards. If the new project is approved, the ESC will refer this document on Electric Fences to the new sectional committee with the request that the committee carefully review it and resubmit it for approval as American Standard with any necessary changes.

1936 are being considered by committees of the National Electrical Manufacturers Association. The revisions cover d-c machines, and feeder voltage regulators. These will be sent to the ASA committee for consideration soon. NEMA committees are also working on proposed standards for capacitor motors which are expected to be submitted to the ASA committee.—*National Electrical Manufacturers Association.*

INSULATED WIRES AND CABLES (OTHER THAN TELEPHONE AND TELEGRAPH) (C8)—Since the last Annual Report, Specifications for Weather-Resistant Saturants and Finishes for Aerial Rubber-Insulated Wire and Cable (C8.19-1940) and Specifications for Heavy Walled Enameled Round Copper Magnet Wire (C8.20-1940) have been approved by the ASA. Specifications for Class A 30 Per Cent Rubber Insulation for Wire and Cables (C8.4-1936) have been withdrawn from the list of American Standards.

The committee has under consideration the status of the following specifications which are now approved as tentative standards:

Specifications for Code Rubber Insulation for Wire and Cable for General Purposes (C8.11-1936)

Specifications for Class AO-30 Per Cent Rubber Insulation for Wire and Cable for General Purposes (C8.17-1936)

American Tentative Standard for Varnished Cloth Insulation for Lead-Covered or Braid-Covered Power Cable (C8.13-1937)

American Tentative Standard for Cotton Braid for Insulated Wire and Cable for General Purposes (C8.12-1935)

American Tentative Standard for Metallic Coverings for Insulated Wire and Cable (C8.15-1938)

Specifications for Weatherproof Wire and Cable (C8k1-1932)

Specifications for Weather Resistant—Weatherproof Wire and Cable—URC Type (C8.18-1936)

Specifications for Heat-Resisting Wire and Cable (C8k2-1932)

It appears that recommendations will probably be submitted to drop Specification C8k1-1932, as this covers a type of wire which is now nearly obsolete. Minor revisions in some of the other specifications may be indicated before they are recommended for adoption as standards.

Work is well advanced on the preparation of a standard for rope-stranded conductors, and it is hoped that a report will be available soon.

Some work has been done on the preparation of standards covering the more usual constructions of rubber-insulated, varnished-cloth-insulated, and paper-insulated cables.

The general program for the committee as set up some years ago is now essentially complete except for the four specifications mentioned above. In the future, therefore, the committee's chief duty will be to make periodic revisions of specifications to take account of progress.—*W. F. Davidson, Chairman; W. H. Bassett, Jr., Secretary.*

HARD-DRAWN ALUMINUM CONDUCTORS (C11-1927)—There has been no call indicating need of a revision for this standard approved in 1927. —*American Institute of Electrical Engineers.*

CODE FOR ELECTRICITY METERS (C12-1928)—A complete revision of the Code approved in 1928 has been prepared by the committee. Copies will soon be submitted for letter ballot of the committee.—*National Bureau of Standards; ASA Electric Light and Power Group.*

750-VOLT DIRECT-SUSPENSION OVERHEAD TROLLEY CONTACT CONSTRUCTION (C15-1935)—No revisions are being considered now.—*American Transit Association.*

DRY CELLS AND BATTERIES (C18-1937)—Work is being done by a subcommittee on a revision of this standard. A report will soon be made to the sectional committee on the progress of the revision.—*National Bureau of Standards, U. S. Department of Commerce.*

INDUSTRIAL CONTROL APPARATUS (C19-1928)—A complete revision of this standard went to letter ballot of the sectional committee in March. —*National Electrical Manufacturers Association; American Institute of Electrical Engineers.*

ELECTRICAL DEVICES AND MATERIALS WITH RELATION TO FIRE AND CASUALTY HAZARDS (C33)—Meetings have been held during the year looking toward the adoption of a standard for the threading of electrical conduit. Progress has been stopped due to the disbanding of the Rigid Steel Conduit Association and there appears to be no immediate prospect of agreement.—*Underwriters' Laboratories, Inc.*

MERCURY ARC RECTIFIERS (C34)—The draft standard which was issued in 1934 is still extant. Due to rapid changes which have taken place in this branch of industry, a new draft will be prepared by the committee as soon as possible.—*American Institute of Electrical Engineers.*

RAILWAY MOTORS AND OTHER ROTATING ELECTRICAL MACHINERY ON RAIL CARS AND LOCOMOTIVES (C35-1936)—A revision of this American Tentative Standard is proceeding and will probably soon be submitted for approval as an American Standard.—*American Institute of Electrical Engineers.*

POWER SWITCHGEAR (C37)—On August 16, 1940, this committee submitted to the Electrical Standards Committee the proposed American Standard for A-C Power Circuit Breakers (C37.4) and five proposed American Recommended Practices. It has been recommended that these standards be published as Proposed American Standards and Proposed American Recommended Practices for one year's trial before final approval.—*H. R. Summerhayes, Chairman.*

ELECTRICAL MEASURING INSTRUMENTS (C39)—No revisions are being considered at the present time in the American Standard, although certain developments relating to instrument performance now before the AIEE Instruments and Measurements Committee are being followed.

Suggestions have been received that the committee undertake a study of the AIEE Standard on Recording Instruments with a view to adoption as an American Standard.—*E. J. Rutan, Chairman.*

STORAGE BATTERIES (C40-1928)—This committee is just being reorganized, but no meetings have been held yet.—*American Institute of Electrical Engineers.*

DEFINITIONS OF ELECTRICAL TERMS (C42)—Work is being carried on by correspondence and through subcommittees. A meeting of the Executive Committee will be held January 8, 1941, when the work will have been brought to the point where the approval of the sponsor and the ASA can be immediately sought.—*American Institute of Electrical Engineers.*

ROLLED THREADS FOR SCREW SHELLS OF ELECTRIC SOCKETS AND LAMP BASES (C44-1931)—Plans are now going forward to revise this standard to cover assembled shells as well as unassembled shells. A great deal of information has been accumulated by a small subcommittee, which is presenting its findings to the sectional committee.—*American Society of Mechanical Engineers; National Electrical Manufacturers Association.*

ELECTRIC RAILWAY CONTROL APPARATUS (C48-1931)—There seems to be no need for a revision of this standard at the present time.—*American Institute of Electrical Engineers.*

ROTATING ELECTRICAL MACHINERY (C50-1936)—Comments and suggestions for revision of this standard have been distributed preparatory to a meeting to be held January 9, 1941.—*L. F. Adams, Chairman.*

The Electrical Standards Committee re-elected its officers and executive committee at its Annual Meeting December 4. Charles Rufus Harte, representing the American Transit Association, was re-elected chairman; Sidney Withington, representing the Association of American Railroads, vice-chairman; and J. W. McNair, of the ASA staff, secretary.

Members of the Executive Committee are:

Charles Rufus Harte, ex officio
L. F. Adams, National Electrical Manufacturers Association
R. E. Hellmund, American Institute of Electrical Engineers
P. H. Chase, Electric Light and Power Group
A. R. Small, Member-at-large
H. L. Huber, Member-at-large

ELECTRIC WELDING APPARATUS (C52)—A meeting to reorganize this committee was held September 20, 1940. The committee is working on revisions of Standards for Electric Arc Welding Apparatus (C52.1-1933) and Standards for Resistance Welding Apparatus (C52.2-1933).—*American Institute of Electrical Engineers; National Electrical Manufacturers Association.*

STANDARDS FOR CAPACITORS (C55-1934)—No call for revision of this standard has been received.—*American Institute of Electrical Engineers.*

TRANSFORMERS (C57)—Standards for Transformers are out for one year's trial period and criticism. Several suggested modifications have been received. All suggestions will be considered before the Standards are submitted for formal approval.—*V. M. Montsinger, Chairman.*

ELECTRICAL INSULATING MATERIALS (C59)—In May of this year the following ASTM standard, submitted to the ASA on the recommendation of sectional committee C59, was approved as American Standard:

Standard Methods of Testing Molded Materials Used for Electrical Insulation (ASTM D 48-39; ASA C59.1-1940)

The committee is now balloting on the submittal to the ASA of a revision of the American Standard Methods of Testing Electrical Insulating Oils (ASTM D 117-36; ASA C59.2-1937)

as well as the submittal of Methods of Testing Powders Used in Manufacturing Electrical Insulators (ASTM D 392-38) for approval as American Standard.

The following ASTM standards are now being reviewed by special committees of the sectional committee looking toward their submittal to the ASA for approval as American Standard:

Methods of Testing Sheet and Plate Materials Used in Electrical Insulation (ASTM D 229-39)

Test for Impact Resistance of Electrical Insulating Materials (ASTM D 256-38)

The committee approved the submittal to the ASA of the ASTM Standard Specifications for Friction Tape for General Use for Electrical Purposes (D 69-38), but this recommendation was withheld by the sponsor until a study can be made by ASTM Committee D-11 on Rubber Products of objections raised by the railroads.—*American Society for Testing Materials.*

VACUUM TUBES FOR INDUSTRIAL PURPOSES (C60)—Action by this committee has been awaiting further action by the Institute of Radio Engineers and the National Electrical Manufacturers Association in order to properly coordinate the standards of these groups with the proposals of the ASA committee.—*Dayton Ulrey, Chairman.*

Revisions are actively going forward in ASA electrical committees on standards on the following subjects:

Copper wire
Dry cells and batteries
Electric welding apparatus
Electrical insulating materials
Electricity meters
Graphical symbols and abbreviations
Illuminating engineering nomenclature and photometric standards
Industrial control apparatus
Insulators
Letter symbols and abbreviations for science and engineering
Lightning arresters
National Electrical Safety Code
Radio
Railway motors
Rotating electrical machinery
Rolled threads for electric sockets and bases
Storage batteries
Transformers
Wires and cables

ELECTRIC AND MAGNETIC MAGNITUDES AND UNITS (C61)—Although this sectional committee is inactive, the Standards Committee of the American Institute of Electrical Engineers has appointed a Coordinating Committee on Basic Theories and Units. This activity arose rather directly from the IEC recommendation of the MKS system. At the request of the AIEE a summary of the situation with regard to electrical units was prepared for publication in *Electrical Engineering*, and appeared in the April, 1940, issue.—*E. C. Crittenden, Vice-chairman.*

LIGHTNING ARRESTERS (C62-1936)—At the October meeting of the Standards Committee of the American Institute of Electrical Engineers, a complete revision of C62-1936 (AIEE No. 28) was approved for transmittal to the sectional committee.—*American Institute of Electrical Engineers.*

CARBON, GRAPHITE, AND METAL-GRAPHITE BRUSHES (C64)—It has been proposed that a sectional committee be organized to undertake a revision of the standard approved in 1935.—*National Electrical Manufacturers Association.*

PREFERRED VOLTAGES—100 VOLTS AND UNDER (C67)—This committee, which was initiated in November, 1939, has now been organized, and an organization meeting may be held soon.

COPPER WIRE (H4)—In May of this year the following ASTM standards, submitted to the ASA on the recommendation of Sectional Committee H4, were approved as American Standard:

Standard Specifications for:

Copper Trolley Wire (ASTM B 47-39; ASA H4.6-1940)

Hot-Rolled Copper Rods for Electrical Purposes (ASTM B 49-39; ASA H4.7-1940)

Bronze Trolley Wire (ASTM B 9-39; ASA H4.5-1940)

Tinned Soft or Annealed Copper Wire for Rubber Insulation (ASTM B 33-39; ASA H4.4-1940)

Soft or Annealed Copper Wire (ASTM B 3-39; ASA H4.1-1940)

Hard-Drawn Copper Wire (ASTM B 1-39; ASA H4.2-1940)

Medium Hard-Drawn Copper Wire (ASTM B 2-39; ASA H4.3-1940)

These last two specifications were revised at the June meeting of the ASTM and will soon be submitted to the ASA for reapproval in their revised form.—*American Society for Testing Materials.*

SPECIFICATIONS FOR WOOD POLES (O5)—The committee has recommended the advancement of six American Tentative Standard Specifications for Wood Poles to the status of American Standard. Subcommittees have been authorized by the committee to study the Specifications for Southern Pine Poles and the Specifications for Western Red Cedar Poles to determine whether revisions are desirable. A subcommittee to consider enlarging the scope of the committee to include other pole species was also authorized. The three new subcommittees will be organized in the near future.—*ASA Telephone Group.*

ILLUMINATING ENGINEERING NOMENCLATURE AND PHOTOMETRIC STANDARDS (Z7-1932)—For several years the sectional committee (which has the same membership as the Committee on Nomenclature and Standards of the Illuminating Engineering Society) has been working on a revision of this standard. A fairly complete draft of the revised and enlarged standard was distributed in October, 1938, but on account of inter-relations with other organizations some parts of the draft have required extensive discussion.

The major part of this standard is also included as a section of the Definitions of Electrical Terms (Project C42), and Committee Z7 is acting also as a subcommittee of Sectional Committee C42. The symbols included in the IES standard also constitute one of the sections under Project Z10, and this committee is likewise a subcommittee of the Z10 Sectional Committee. Extensive discussions have been going on for the adjustment of differences between the various subcommittees of Z10.

The IES committee also has cross connections with committees of the Optical Society of America on Colorimetry and on a glossary of optical terms. These two committees are not under ASA procedure but it is, nevertheless, desirable to correlate their work with ours and to make the various standards as nearly consistent as possible.

In spite of these complications it is hoped that a revised draft of Z7 can be submitted early in 1941.—*Illuminating Engineering Society.*

LETTER SYMBOLS AND ABBREVIATIONS FOR SCIENCE AND ENGINEERING (Z10)—Twelve separate standards have been approved and published at various times. Those dealing with graphical symbols are now handled by Sectional Committee Z32. Eleven subcommittees have been formed under Committee Z10 and several of these are working actively on revisions of the reports which were approved and published about ten years ago. Two of these (Electricity and Physics) have been published in preliminary form, and one on Abbreviations for Scientific and Engineering Terms is being submitted to the ESC for recommendation to Standards Council.—*American Institute of Electrical Engineers; American Association for the Advancement of Science; American Society of Civil Engineers; American Society of Mechanical Engineers; Society for the Promotion of Engineering Education.*

GRAPHICAL SYMBOLS AND ABBREVIATIONS FOR USE ON DRAWINGS (Z32)—All of the present graphical symbol projects are being revised, and many meetings of subcommittees were held during the past year. The American Institute of Electrical Engineers is planning to publish the revisions of those in the electrical field as soon as they are approved.—*American Institute of Electrical Engineers; American Society of Mechanical Engineers.*

The eleven standards approved by the American Standards Association during the past year on recommendation of the Electrical Standards Committee are:

National Electrical Code (C1-1940)
Safety Rules for Radio Installations (C2.5-1940) (Revision of Part 5 of the National Electrical Safety Code)
Rubber-Insulated Tree Wire (C8.16-1940)
Standard Methods of Testing Molded Materials Used for Electrical Insulation (C59.1-1940)
Copper Trolley Wire (H4.6-1940)
Hot-Rolled Copper Rods for Electrical Purposes (H4.7-1940)
Bronze Trolley Wire (H4.5-1940)
Tinned Soft or Annealed Copper Wire for Rubber Insulation (H4.4-1940)
Soft or Annealed Copper Wire (H4.1-1940)
Hard-Drawn Copper Wire (H4.2-1940)
Medium Hard-Drawn Copper Wire (H4.3-1940)

In addition to these approved standards, the proposed American Standard for Transformers was issued by the ASA upon recommendation of the ESC for a year of trial in use.

Australian Ladder Standard Now Being Revised

A new edition of the Australian Standard Rules for the Design, Construction, and Erection of Platforms, Gangways, Stairs and Ladders is being prepared by the Standards Association of Australia. One suggestion being considered is for a revision of the riser-to-tread ratio on stairways.

The Association is asking for suggestions based on experience in the design, erection, and maintenance of ladders and stairs for improving the present edition of the standard.

ASTM Textile Standards Are Issued in One Volume

The most recent editions of standard definitions and terms, methods of testing, and specifications for textiles, developed by the American Society for Testing Materials, have been collected in a single document, which also includes additional information such as photomicrographs of textile fibers, tables for yarn number conversion and relative humidity, and drafts of new test methods. Abstracts of papers presented at meetings of ASTM Committee D-13, as well as a glossary of textile terms, and a proposed recommended practice for calculating number of tests are also included. The publication includes in a single cover the data which the Society believes to be of importance to all who deal with textile materials.

Forty-one standards and 24 tentative standards have now been adopted by the Society as the result of the work of its Committee D-13. These standards cover not only methods of test for textile materials but also tolerances within which the textile must come in order that it shall constitute a good delivery on contract. In addition to test methods and tolerances, the committee has recently undertaken the writing of specifications of textile materials for specific uses, such as tire cord, chafer tire fabrics, electrical tapes, asbestos textiles, and household fabrics. Four new standards for glass textiles are included for the first time.

Committee D-13 announces in the new publication that in order to promote uniformity of nomenclature in the presentation of textile color data, Committee D-13 endorses the method of designating colors developed by the Inter-Society Color Council at the National Bureau of Standards. This method is commonly referred to as the ISCC-NBS method. An abstract of a paper presented by Dorothy Nickerson at the committee's meeting in March, 1940, which discusses this method is included in the new document.

The *ASTM Standards on Textile Materials* is available from the American Society for Testing Materials, 260 South Broad Street, Philadelphia, at $2.00 per copy. Separate copies of the individual standards and tentative standards are also available from the Society at 25 cents per copy. Special prices are available for orders in quantity lots.

Standards Would Have Helped Prevent French Defeat

Declares Arthur Nutt, SAE President

Proper standards for materials and detail design requirements for engine mountings, accessory mountings, and other parts would have been of considerable assistance to the French defense program if they had been available at the beginning of the war, Arthur Nutt, president of the Society of Automotive Engineers, said in talks before several of the Society's local sections recently. Mr. Nutt, who is vice-president of engineering of the Wright Aeronautical Corporation, based his remarks on personal observations made in France while on a special mission to the French Government as adviser on airplane-engine production.

Serious factors in the disorganization of the French Forces, Mr. Nutt revealed, were lack of coordination of service activities, procurement of government-furnished materials, planning for spare parts, planning of selection of new engine types and sizes, and in furnishing manufacturers with proper selection schedules, as well as frequent breakdown of the country's communication system. Progress was hampered, he explained, by slow technical approvals and poorly organized inspection and control. Contractors were saddled with severe contract penalties and profit limitations, and there were inadequate provisions for financing and expansion on a war-time basis.

The French defense program, he declared, was scheduled to be in full swing by 1941—but the Germans made their major attack in 1940.

ASME Submits Standard for Soldered-Joint Fittings

A proposed American Standard for Soldered-Joint Fittings has been submitted to the American Standards Association by the American Society of Mechanical Engineers, sponsor for the project. The proposed standard covers dimensions of soldered-joint wrought metal and cast brass fittings for copper tubing including detailed dimensions of the bore; minimum inside diameter of the fitting; metal thickness for wrought-metal and cast-brass fittings; general dimensions for cast brass fittings including center-to-shoulder dimensions for both straight and reducing cast fittings; and minimum specifications for materials.

Universe Based on Standard Parts

Declares Research Foundation Director

"The modern engineer is very proud of his development of the principle of the standardization of parts from which it results that with a limited number of screw sizes, nail sizes, iron pipe sizes, and so forth, he can build everything from a battleship to a lady's boudoir. However, the engineer was not the first in the field; it was the Grand Architect of nature who was the first to introduce the idea of a standardization of parts, and with three fundamental standard parts He built the universe. These three primeval bricks are the electron, the fundamental unit of negative electricity; the proton, a particle 2,000 times as heavy, and carrying a positive electric charge equal in magnitude to that of the electron; and the neutron, a particle carrying no electric charge, but weighing about as much as the proton. In the architecture of nature these particles are built into about 92 different structures which represent the different atoms of the elements, and the atoms of the various elements are built into other structures of countless numbers which represent all the chemical compounds constituting the stuff of nature."

—From address on "Atomic Power" by Dr. W. F. G. Swann, director, Bartol Research Foundation of the Franklin Institute at the Herald Tribune Institute of Public Opinion, October 27.

Canadian Association Revises Machine Screw Standards

Changes which have developed in the methods of gaging rolled-thread machine screws for commercial purposes, as well as advisability of standardizing Canadian and United States practice, have necessitated the revision of the Canadian Standard Established Lists of Machine Screws and Square and Hexagon Machine Screw Nuts, the Canadian Engineering Standards Association announces. In the new edition, tables cover Class 1, 2, 3, and 4 Screw Thread Fits for both fine and coarse thread series, and an increase in the length of thread of machine screws is specified.

Copies of the CESA Established Lists of Machine Screws and Square and Hexagon Machine Screw Nuts (B 29-1940) are available from the Canadian Engineering Standards Association, National Research Building, Ottawa, at 50 cents per copy.

Two New Standards Approved Under Canadian Electrical Code

The Canadian Engineering Standards Association announces the publication of two standard specifications under Part II of the Canadian Electrical Code, the requirements of which must be met in order to obtain CESA approval of the electrical equipment concerned. The standards were prepared in collaboration with interested manufacturers and industrial associations and are based upon laboratory tests and record in service.

Copies of the two standards—Pull-Off Plugs for Electrothermal Appliances (C22.2 No. 16-1940) and Insulated Conductors for Power-Operated Radio Devices (C22.2 No. 57-1940)—may be ordered from the Canadian Engineering Standards Association, National Research Building, Ottawa, at 50 cents per copy.

Action on Standards Shows Trend Toward Consumer Goods Labels

The development of standards and improved labeling for consumer goods are moving forward with increased impetus, reports *Forecast*, December, 1940. The magazine cites the request of the National Electrical Manufacturers Association that the American Standards Association authorize a project to develop a standard for domestic electric flat irons as an example of this trend.

Other examples include plans by the National Food Distributors Association for packaging and labeling standards for frosted foods and certain types of salad dressings, and standards developed by the Porcelain Enamel Institute for porcelain enamel tops used on kitchen tables and cabinets, dinette and breakfast sets, *Forecast* declares.

U. S. Steel Discovers The Consumer Movement

"Have you ever gone shopping with a woman?" asks U. S. Steel in its current trade paper advertisement. And proceeds to discover through a woman's search for values from store to store, and finally from the demand of consumer organizations for product standards, that "informative labeling is not only a demand but a fact."

The "fact," according to U. S. Steel is the U-S-S Quality Label, which is supplied to manufacturers using U-S-S Steels for promotion of consumer products. Products which fall within 47 classifications are using the Steel label, according to this advertisement.

Standard Color Test For Porcelain Enamels

A project being carried on jointly by the National Bureau of Standards and the Porcelain Enamel Institute is the development of a test for evaluating color differences between nearly identical specimens of porcelain enamel, according to an announcement in the December issue of the *Technical News Bulletin*, published by the National Bureau of Standards.

In order to carry on the work of establishing a standard test, a special subcommittee of the Porcelain Enamel Institute was formed. Members of the subcommittee prepared 15 sets of 13 specimens each. Each set consisted of a central standard and 12 other specimens having slight, systematic differences from the central standard in their hue, saturation and lightness. The colors of the central standards were widely varied within the possible range.

In attempting to establish the most accurate test possible, visual estimates of the directions and magnitudes of the differences between the central standards and the similarly colored specimens in the respective sets were made at the National Bureau of Standards and at several cooperating laboratories. Also, several different means of determining these differences by computation from data obtained on various instruments are being tried.

In order to arrive at reasonably good agreement between the averages of the visual estimates and the computations from the data obtained on the various instruments, it is planned, if necessary, to modify the formulas or one or another of the instruments. If this can be done successfully, the method of using instruments to compute differences between specimens will be recommended as the standard method, the National Bureau of Standards states.

The standard test, when it is officially decided upon, will be important as a control method for manufacturers and also as a test method for purchase specifications, according to announcement by the Bureau.

The Porcelain Enamel Institute and the National Bureau of Standards have been cooperating in developing other standard tests for porcelain enamels besides the one for evaluating color differences between nearly identical specimens.

National Bureau of Standards Announces New Reflectometer

A reflectometer to measure color, apparent reflectance, and specular gloss photoelectrically has been designed by R. S. Hunter of the Colorimetry and Spectrophotometry Section of the National Bureau of Standards to meet the needs of standard tests of the Porcelain Enamel Institute. The Institute needed a device to measure both 45 degrees, 0 degrees luminous apparent reflectance (required by PEI standard reflectance test for porcelain enamels) and 45 degrees, —45 degrees specular gloss (required by the PEI standard tests for acid resistance and surface abrasion resistance of porcelain enamels). The Bureau has cooperated with the Porcelain Enamel Institute in the development of these tests and as a part of this cooperation undertook in 1936 to design improved apparatus.

The instrument measures the apparent reflectance, the hiding power, and the opacity of paints, papers, and porcelain enamels, the National Bureau of Standards announces. Measurements with it will help in evaluating the efficiency of soaps and detergents for cleaning fabrics. With the proper spectral filters, the device may also be used in determining the magnitude and character of color differences between samples which are similar to each other in color. Settings with these filters provide a basis for evaluating the whiteness, yellowing, fading, bleaching, blueing, and tinting strength of textile materials. With different filters, chosen to transmit narrow spectral bands, the reflectometer may be used for abridged spectrophotometry. Values of specular gloss measured with the instrument are used to evaluate the shininess of surfaces and to classify paints and other materials for gloss. With an attachment which has been designed, the instrument will measure the transmissions of non-diffusing liquids, glasses, and plastic samples.

In the reflectometer, two light beams from a single source are directed along separate paths to two barrier-layer photocells. The operating characteristics of a number of barrier-layer photocells were analyzed to determine which types were most suitable and how to use them most advantageously. A substitution null method, employing a galvanometer to indicate equality of the currents generated by the two photocells, was

finally chosen. For each sample tested, there is a photometric adjustment to restore equality of currents. The amounts of photometric adjustment are measured on the direct-reading scales, one of which is used for apparent reflectance and the other for specular gloss. Because of its high precision, the reflectometer is especially suited for measuring small differences in apparent reflectance, gloss, or color of nearly identical samples.

A paper describing the reflectometer (RP1345) is published in the November numbers of the *Journal of Research*, National Bureau of Standards, and of the *Journal of the Optical Society of America*. Copies of RP1345 may be obtained from the Superintendent of Documents, Government Printing Office, Washington, D. C.

CESA Issues First Standard For Insulated Power Cable

The Canadian Engineering Standards Association has issued the first of a series of specifications covering insulated power cable, which is intended to apply to all sizes and classes of impregnated paper-insulated lead-covered cable used for the transmission and distribution of electrical energy, as customarily installed under average conditions.

Copies of CESA Standard Specifications for Paper-Insulated Lead-Covered Cable (C 68 (A)-1940), may be ordered from the Canadian Engineering Standards Association, National Research Building, Ottawa, at $1.00 each.

ASA Standards Activities

Approved Standards Available Since Publication of Our December Issue

Addendum B16e4 to American Standard Steel Pipe Flanges and Flanged Fittings, B16e-1939 Gratis

Specifications for Welded and Seamless Steel Pipe (Revision of B36.1-1936) American Standard B36.1-1940 25c

Specifications for Lap-Welded and Seamless Steel Pipe for High-Temperature Service (Revision of B36.3-1939) American Standard B36.3-1940 25c

Standards Approved Since Publication of Our December Issue

Steel Butt-Welding Fittings American Standard B16.9-1940

Standards Now Being Considered by Standards Council for ASA Approval

Manhole Frames and Covers for Subsurface Structures A35.1

Soldered-Joint Fittings A40.3

Keyways for Holes in Gears B6.4

Cast-Iron Pipe Flanges and Flanged Fittings, Class 250 (Revision of B16b-1928)

Wrench-Head Bolts and Nuts and Wrench Openings (Revision of B18.2-1933)

Safety Rules for the Installation and Maintenance of Electrical Supply Stations, Part I of the National Electrical Safety Code C2, Part I

Electric Fences, Part 6 of the National Electrical Safety Code C2, Part 6

Protection of Structures Containing Inflammable Liquids and Gases—Part 3 of Code for Protection Against Lightning (From status as American Tentative Standard to American Standard) C5, Part 3

A-C Power Circuit Breakers C37.4

Methods for Determining the Rms Value of a Sinusoidal Current Wave and a Normal Frequency Recovery Voltage C37.5

Schedule of Preferred Circuit-Breaker Ratings C37.6

Operating Duty for Standard and Reclosing Service C37.7

Rated Control Voltages C37.8

Test Code for Oil Circuit Breakers C37.9

Commercial Standards for Sun Glass Lenses (CS 78-39; CS 79-39)

Methods of Testing and Tolerances for Tubular Sleeving and Braids (ASTM D 35436) L13

Proposed American Recommended Practice for the Use of Explosives in Anthracite Mines M27

Northern White Cedar Poles 05b1

Western Red Cedar Poles 05c1

Chestnut Poles 05d1

Southern Pine Poles 05e1

Lodgepole Pine Poles 05f1

Douglas Fir Poles 05g1

(The above six standards in the Wood Pole group are under consideration as American Standards from status of American Tentative Standard)

Abbeviations for Scientific and Engineering Terms (Revision of Z10.i-1932)

Motion Picture Standards Z22.2 through Z22.33

Specifications for Accident Prevention Signs Z35.1

Allowable Concentrations of Carbon Monoxide Z37

Allowable Concentrations of Hydrogen Silfide Z37

Allowable Concentrations of Carbon Disulphide Z37

Allowable Concentrations of Benzene Z37

New Project Authorized

Application of Statistical Methods to Qualify Control of Materials and Manufactured Products Z1

New Projects Being Considered

Domestic Electric Flat Irons

Proposed American Standard for A-C Power

CIRCUIT BREAKERS

Published for trial and criticism

Standards and test codes for circuit breakers.

Most complete and compact source of information on performance requirements and test methods published to date.

Contains data secured from many sources.

Covers:

a. Oil circuit breakers

b. Circuit breakers using liquids other than oil

c. Air circuit breakers

60¢ *per copy*

Order from:

American Standards Association

29 West 39th St. New York